DOCUMENT RESUME

ED 430 205 CG 029 300

AUTHOR Shmurak, Carole B.
TITLE Career Aspirations of Young Women in High School and in College: A Seven Year Longitudinal Study.
PUB DATE 1999-04-00
NOTE 20p.; Paper presented at the Annual Conference of the American Educational Research Association (Montreal, Canada, April 19-23, 1999).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Aspiration; Career Development; *Careers; Coeducation; College Admission; *College Students; *Females; Grade Point Average; *High School Students; High Schools; Higher Education; Longitudinal Studies; School Role; Sex Role; Single Sex Schools; Standardized Tests; Student Development

ABSTRACT

This paper reports on a longitudinal study with results drawn from 7 years of data on a group of young women (N=42), following them from the ninth grade through the third year of college. The purpose of the study was to trace development of the participants' thinking about school, career, and women's roles while also tracking their grades, standardized test scores, and college admission data. This study was intended to help answer questions about the relationship between aspirations and achievement of young women in both coeducational and single sex schools, and the relative influences of high school and college on their career choices. Results show that many of the girls aspired to nontraditional careers but the range of careers was limited. Most of the girls were "clueless" as to the requirements of their "chosen" fields. The girls reported that no one talked to them about potential careers; this did not seem to be a result of sexist attitudes on the part of teachers. Some students seem to have lowered their aspirations as a result of their first year of college. (Contains 5 tables and 23 references.) (MKA)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

CG

ED 430 205

Career Aspirations of Young Women in High School and in College: A Seven Year Longitudinal Study

Carole B. Shmurak

Department of Teacher Education

Central CT State University

New Britain, CT 06032

Presented at the annual meeting of the American Educational Research Association, Montreal, Canada, April 1999.

BEST COPY AVAILABLE

CG029300

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

C. Shmurak

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

According to Farmer (1985), motivation to pursue a career develops through three sets of interacting influences: background variables (gender, ethnicity), psychological variables (attitudes, self-concept), and environmental variables (support from parents and teachers). Having a working mother is a positive influence for a girl to pursue nontraditional careers (Betz and Fitzgerald, 1987), as is parental support in general (Farmer, 1985).

Walker and Mehr (1992), studying 600 alumnae from the formerly all-girls Hunter High School in New York City, found that almost all of them wished they had had more help setting career goals as teenagers. Ninety-eight percent said that a missing aspect of their education was a person who could help them to prepare for the obstacles in the world outside their sheltered one at the high school. Walker and Mehr concluded that high school girls need guidance to help them to imagine future lives and to devise strategies to overcome the barriers that might stand in their way.

Adolescents are in the stage of career development called "crystallization of vocational preference" by Super (1963); they are just beginning to formulate ideas as to fields and levels of work that are appropriate to their self-concepts and making tentative choices that will enable them to get the education needed for a specific occupation. Teachers can help by opening their eyes to fields of which their students may be unaware. Csikszentmihalyi et al. (1997) report that teachers who take their students' abilities seriously and talk to them about their futures often provide the experience that crystallizes a career goal. Eccles (1989) recommends active career counseling on the part of teachers, providing students with a reason for studying their subjects and telling them how these subjects relate to the occupational world.

The study on which this paper is based is longitudinal, and the results cited here are drawn from seven years of data on a group of young women, following them from the ninth grade through the third year of college. The purpose of the study was to trace the development of the participants' thinking about school, career, and women's roles while also tracking their

grades, standardized test scores, and college admission data. This study was intended to help answer questions about the relationship between aspirations and achievement of young women in both coeducational and single sex schools, and the relative influences of high school and college on their career choices.

Method

In the fall of 1992; heads of four independent college preparatory schools in Connecticut gave the author permission to conduct a longitudinal study at their schools. That fall, all ninth grade girls in each of the four schools were administered questionnaires that included questions about college and career aspirations as well as the 15-item form of the survey known as the Attitudes Toward Women Scale or AWS (Spence & Helmreich, 1979). By administering these questionnaires early in the fall, any effects of the school itself were minimized and the attitudes thus measured can be assumed to represent the girls' opinions independent of the school they attended. There were no significant differences among the initial attitudes of girls attending the different schools. Thus girls choosing coeducational or all-girls schools did not start out with different views of women's roles or careers.

From the total number of 114 female ninth graders at the four schools, 57 girls volunteered for the study and were given permission by their parents to participate. During the four years of high school, ten of these girls left the schools, but seven of them nonetheless remained in the study, so 54 girls completed the first four years of the study. There has been some attrition as the college years have progressed, but 42 students continue to answer questions.

In May of 1993, each of the four schools was visited and interviews were conducted with the girls. At this time, the subjects filled out the AWS questionnaire a second time. The same interview and questionnaire procedure was followed in May of 1994, 1995, and 1996. Each June, the schools provided information about the girls' grades and standardized test scores. In the 1995 interviews, the uniformity of answers about a lack of career guidance

from teachers and counselors led the author to wonder whether this was due to the interviewees' gender or to the upper-middle-class focus of the schools regardless of gender. Therefore, interviews were sought with a few boys at one of the coeducational schools. The headmaster was able to get three boys, who he felt were a representative sample of the boys at his school, to volunteer. This is, of course, not a true control group, but does provide some interesting contrasts nonetheless.

In the late fall of 1996, all of the young women were contacted again by mail or E-mail at their respective college campuses. All who responded to the fall 1996 queries (51 out of the original 57) were interviewed, in person or by phone, in the spring of 1997, as they completed their first year of college.

The study is ongoing. In the fall of 1998, these students, most in their junior year of college, were contacted by phone or E-mail; at that time most of them had declared their majors and had a somewhat clearer idea of what careers they plan to pursue after college.

Results

Case studies of many of these girls and quantitative comparisons across schools appear in my book, *Voices of Hope* (Shmurak, 1998), which was written when these young women were completing their first year of college. In this paper, I focus on career development only and on development of the girls' thinking since the first year of college. Many girls at all four high schools aspired to "nontraditional" careers. There did not seem to be any difference in the careers to which the girls aspired based on what type of school they attended. These aspirations seemed largely unrelated to parents' careers, and unfortunately, in some cases, to the girls' abilities. But the range of these careers was limited. Among these girls, there were none who wanted to be engineers or dentists or computer scientists, and only one or two who ever wanted to be architects or veterinarians. This is consistent with earlier findings (Shmurak, 1994b) that independent school alumnae do not tend to enter these fields. Graber (1994) has also found very few girls who are interested in careers in science or engineering in her longitudinal study of girls

attending independent schools in New York City. The fact that high socioeconomic status, though positively correlated with academic achievement, is negatively correlated with majoring in quantitative fields in college (Ethington & Wolfle, 1988; Maple & Stage, 1991; O'Hara, 1995) may mean that the economic incentives to entering fields like engineering or computer science are absent for most of these girls. Even among the scholarship students at these schools, there were no aspiring engineers or computer scientists, so the culture of the independent school may tend to discourage girls from aspiring to these fields. Girls from public high schools have entered these fields in increasing numbers over the years (Shmurak, 1994a).

Most of the girls, at both types of schools, were "clueless" as to the requirements of their "chosen" fields (as were the three boys interviewed in 1995). Career aspirations measured during high school are very volatile and often unrealistic (Jordaan & Heyde, 1979) and independent schools, whether coeducational or single sex, have never emphasized career planning, so this was not extremely surprising. Over and over, the girls reported that no one ever talked to them about potential careers. Usually the topic came up for them for the first time when they went to see their college counselor at the end of junior year. There were relatively few exceptions to this. Language teachers seemed to provide some (limited) information as to the usefulness of being bilingual in certain careers. Teachers of drama and art history provided some career information. Mathematics and science teachers seemed to be particularly remiss, however, in providing girls with career guidance. Girls who said that they liked science were unaware of career opportunities except for the most obvious one: medicine.

This did not seem to be a result of sexist attitudes or of teachers' taking girls' careers less seriously than that of boys. Of the three boys interviewed, none had ever discussed career aspirations with a teacher. All three aspired to science-related careers (engineering, medicine, and physical therapy) and yet had not discussed this with anyone at their school except the college counselor. One of the three boys, on the other hand, had been taken by his father to a career counseling service because his father was concerned that he still had no career direction by eleventh grade. Not even one of the girls in the study mentioned any such concern on the

part of their parents. Most said that their parents "just want me to be happy." This probably does reflect the fact that parents are still more concerned with their sons' careers than with those of their daughters.

Some students seem to have lowered their aspirations as a result of their first year of college, as Arnold (1995) and Holland and Eisenhart (1990) have reported. One difficulty with quantifying how many students to include in this category is the question of what actually constitutes a lower aspiration. For example, several students have decided to become teachers who have never mentioned this as a career before—is this a lowered aspiration? Certainly, teaching is a more traditional women's career and of lower status in American society than medicine or law. On the other hand, a woman pursuing a traditional career such as nursing or teaching could be as strongly career-oriented as a woman pursuing a nontraditional career (Betz & Fitzgerald, 1987).

The question is whether the student herself sees this as a lesser career. In some cases, the students seem to be "falling back" on teaching as something they can easily do, whereas previous career choices would require more ambition. Robin (Table 3), whose career goals in the past had included architect and medical ethicist, said in November of this year: "My goals have changed, thinking a little more realistically now, because I love the benefits of teaching in the career sense as it lets me begin a family and have good security although the pay isn't great. I love kids and want the summers off and like to help people."

Others are abandoning careers and going into teaching because they don't want to deal with the challenging science courses and competition required by their previous career choices. In a few cases, the importance of boyfriends in their lives at present seems to be a factor that leads them to "scaled down ambitions and notions of self" (Holland & Eisenhart, 1990, p. 186). Here is an example (from Elizabeth, Table 4, who has changed from medicine to physical therapy this year): "I decided that medical school will wait, if I ever go. I decided that I had different priorities now. I really want to get married and have a family. Having a career is absolutely still important to me. I just feel that I do not want medicine to be my top priority all of

the time and from the doctors I have spoken to, if you become a doctor, medicine has to be your top priority.. That isn't what I want." Both Elizabeth and Robin have consistently scored low on the Attitudes Toward Women Scale, so their defection from nontraditional careers is not surprising; on the other hand, Anne (in Table 1) is one of the persisters in wanting to be a doctor and she has scored consistently low as well, so low AWS score is not always a good predictor here.

Some are harder to judge. Two former pre-med students no longer wanted to study medicine at the end of the first year of college. Both give as their reason changes in the medical care system. One is considering teaching for the first time, but isn't sure at what level; she could equally well see herself teaching college or kindergarten. Another is thinking about being a psychologist or a lawyer. These two do not seem to have significantly lowered their aspirations. Two of the subjects have given up their nontraditional career aspirations of veterinarian and architect, respectively, as a result of disillusionment with their entry level courses. They have not yet made firm commitments to new careers, so it is too early to say that they have lowered their aspirations.

As they finish their junior year in college, only two of these young women still want the career they named in ninth grade: Lita (Table 1) who wants to be an actress and Sage (Table 4) who wants to be a lawyer. Of the 54 girls completing the first four years of the study, 12 held the same career goal in 12th grade as they did in 9th grade, while the rest had more volatile goals throughout high school. The transition to college caused many changes in aspirations, with only 19 out of 51 maintaining their 12th grade goals one year later, at the end of their first year of college. The first three years of college have also led to changes, with 20 out of 42 keeping their career goals from freshman year intact.

Not surprisingly, the attrition in science-related goals is striking. Twenty-four girls named science-related careers in 9th grade, but only 18 persisted in this by 12th grade. The high school to college transition lowered this number to 12, and as of their junior year in college, this number is eight (three physical therapists, two doctors, one wildlife manager and one

environmental lawyer). Note that even in this group, none are in the "hard" sciences, one has switched from medicine to law while keeping a scientific interest, and three are espousing the more traditional female field of physical therapy.

Although I found few differences between the girls who went to girls' high schools and the girls who went to the coeducational high schools, either initially or at the end of the 12th grade, there were some differences in science and math enrollments, as I explained in my book (Shmurak, 1998): on the whole, girls at the coed schools enrolled in more math and science classes. At the end of junior year in college, however, a pattern in science persistence may be developing. As 9th graders, 12 girls from the girls' schools and 6 girls from the coed schools aspired to science-related careers; as 12th graders, this difference had greatly diminished, with 8 from the girls' schools and 7 from the coed schools expressing interest in careers in the sciences. By the end of the first year of college, it was 5 and 6; at present it is 2 from the girls' schools and 6 from the coed schools who persist in interest in science. (As previously mentioned, "science-related career" is being broadly defined to include physical therapy and environmental law.) It may be that the strong contrast between the warm, nurturing environment of the girls' school and the cold impersonal atmosphere of the college science class leads to increased attrition from science in girls' high school graduates, as I previously hypothesized in earlier papers (Shmurak 1994a,1994b).

Table 1. Career Profiles of the Girls from Summerford School (girls' school)

Student	Start of 9th grade	End of 12th grade	End,1st yr of college	3rd year of college	Major
Jane	Doctor	Doctor	Doctor	Something with human rights	Political sci
Mimi	Doctor	Doctor	Doctor	Psychologst	Spanish; psychology
Roxanne	Undecided	Sports medicine	Psychologst or lawyer	Undecided	Psychology
Anne	Lawyer	Doctor	Doctor	Doctor	Biology
Lita	Actress	Actress	Actress	Actress	Drama
Maria	Architect	Architect	Undecided	Undecided	None yet
Beth	Undecided	Undecided	Business	Bus. mgt	Bus. mgt.
Dina	Undecided	Speech pathologist	Speech pathologist	?	?
Christina	Physical therapy	Undecided	Undecided	?	?
Amelia	Mother	Undecided	Undecided	Special educ	English
Anastasia	Doctor	Marketing	*	?	?
Nichelle	Actress	Undecided	Undecided	Undecided	Spanish
Vivien	Undecided	Lawyer	Lawyer	?	?
Wanda	Diplomat	Counseling	*	Law**	English

* Did not attend college in 1996-97.
** Is in 2nd year of college.

Table 2. Career Profiles of the Girls from Watson Hill School (girls' school)

Student	Start of 9th grade	End of 12th grade	End,1st yr of college	3rd year of college	Major
Edith	Undecided	Biologist	Biologist	Wildlife mgt.	Biology
Lynn	Biologist	Journalist	Teacher	Teacher	English
Eliza	Veterinarian	Veterinarian	Business	Minister	Philosophy
Betsy	Doctor	Doctor	Doctor or psychologist	Psychologist	Psychology
Trudy	Doctor	Photographer	Photographer	Politics (feminist)	Photography
Kelly	Undecided	Business	Undecided*	?	?
Cindy	Undecided	Business	Business	Advertising on WWW	Marketing; Computers
Sydney	Doctor	Business	?*	?	?
Alexia	Psychiatrist	Teacher	Business	Marketing	Marketing
Anne	Psychiatrist	Undecided	Undecided	Undecided	French
Marie	Undecided	Undecided	Undecided	Undecided	Economics Education

* Did not finish first year of college

Table 3. Career Profiles of the Girls from Egremont School (coed school)

Student	Start of 9th grade	End of 12th grade	End,1st yr of college	3rd year of college	Major
Kerry	Undecided	Undecided	Journalist or teacher	Teacher	English
Whitney	Psychologst	Journalist	Community activist	Professor of sociology	Education; African-Am Studies
Kasmira	Zoologist	Lawyer	Social wker or teacher*	Teacher	In the Navy
Stephanie	Accountant	Languages	Undecided	?	?
Christine	Teacher	Sports psychologist	Physical therapist	Physical therapist	Natural sci
Andrea	Undecided	Biologist	Biologist	Biologist?	Biology
Leah	Actuary	Researcher	Doctor	Doctor?	Biology
Shelby	Undecided	Undecided	Undecided*	Actress	Drama
Jocelyn	Undecided	Pharmacist	Undecided	Speech pathology	Speech pathology
Jill	Designer	Undecided	?	?	?
Britt	Stockbroker	Writer	Business	Undecided	Public relations
Robin	Architect	Medical ethicist	Teacher	Teacher	Elem. Ed.
Anna	Doctor	Undecided	Undecided	Professor of sociology?	Sociology

* Did not finish first year of college

Table 4. Career Profiles of the Girls from Northington School (coed school)

Student	Start of 9th grade	End of 12th grade	End,1st yr of college	3rd year of college	Major
Charlie	Doctor	Doctor	Undecided	Teacher	English
Sage	Lawyer	Lawyer	Lawyer	Lawyer	Philosophy Afr-Amer studies
Natasha	Writer	Athlete	Sports	Undecided	History
Lindsay	Physical therapy	Physical therapy	Kindergtn teacher	Kindergtn teacher	Sociology El.Ed.
Elizabeth	Undecided	Doctor	Doctor	Physical therapist	Psychology
Alexandra	Doctor	Doctor	Environ. Law	Environ. Law	Environ. Studies
Carla	Undecided	Magazine editor	Magazine editor	Magazine editor	English
Taylor	Mother	Elem. teacher	Undecided	Mgt.	Human Resources
Paige	Undecided	Real estate	Physical therapy	Physical therapy	Psychology

Table 5. Career Profiles of the Girls Who Left

Student	Start of 9th grade	End of 12th grade	End,1st yr of college	3rd year of college	Major
Corrine	Business	Business	Business	Undecided	International Culture/Econ
Ellen	Doctor	Psychiatrist	Undecided	Undecided	Communicns
Lenore	Photographer	Photographer	Photographer	?	?
Melissa	Veterinarian	Psychiatrist	Psychiatrist	?	?
Veronica	Journalist	Undecided	Art gallery	?	?
Penny	Lawyer	Nurse	Nurse	Work with people	History
Racquel	Doctor	Psychologist	Lawyer	?	?
Victoria	Undecided	?	?	?	?
Anne	Lawyer	?	?	?	?
Monica	Psychologist	?	?	?	?

Discussion

The lack of career guidance provided by the four high schools in this study was striking. Except for the college counselors who met with them near the end of their junior year, almost no faculty seemed to spend the time talking to these girls about possible careers.

Girls with talent and interest in mathematics and science knew only about medicine as a career. One girl (Roxanne, Table 1), who took two years of physics (including Advanced Placement Physics) and a year of advanced placement calculus in high school, was never encouraged to consider a career in engineering. Another (Beth, Table 1) told me that her strength was mathematics, but she knew of no careers that used mathematics except for accounting. Parents of these girls offered little guidance; most girls reported that "they just want me to be happy."

With respect to career guidance, these schools provide what Betz and Fitzgerald (1987) characterize as a "null environment;" that is, they do nothing specifically about career guidance. Because there continues to be more cultural and parental support for young men's careers, Betz and Fitzgerald conclude that failure to counteract the null environment is discriminatory against women. Eccles (1989) agrees that equal treatment in schools is not enough to increase the probability that young women will seriously consider nontraditional educational or vocational options, since they are exposed to heavy doses of gender-role socialization outside of school.

It may be that the teachers themselves are unaware of many careers associated with their respective subjects; in that case, it behooves them to make the effort to find out, and the schools to provide the resources and time for the teachers to do it. Teachers would likewise have to know the requirements for certain occupations so that they could advise a student interested in architecture, for example, that physics courses may be as important as art classes for her future.

In Walker and Mehr's (1992) study of Hunter High School graduates, the alumnae said "they wanted to do something, but didn't know what. Sometimes they knew what, but didn't know *how*" (p. 42). With adult guidance lacking in high school, they hoped that "when I started college that something would come to me" (p. 96) and often described themselves as "tripping"

into their life choices (p. 46). These vague hopes typified many of the girls in my study, and indeed a significant number of the young women in the study are still hoping to trip into a career choice.

Another aspect of my study that relates to career development is the repeated difficulty that the girls at all schools had with answering the question, "What are you good at?" At first, I assumed that they were reluctant to seem immodest about their accomplishments; in the third year of the study, however, I asked many of the girls directly why the question was difficult to answer, and discovered that this was simply a question that they never posed for themselves. "I'm always concentrating on what I have to improve, not what I'm good at," was the common answer.

It seems to me that during this period of career exploration, asking this question of themselves is crucial. Teachers and other adults in the community need to help girls (and boys) assess realistically what their strengths are. Girls who decide at an early age to be doctors or architects without the realization of what their personal strengths are, or what those professions require, are filled with false hopes. Girls who face challenging and competitive college courses without any strategies for coping with them are likely candidates for crushed hopes.

For the girls in my study, parents gave them little guidance ("Do whatever makes you happy") and their teachers seldom saw beyond college acceptance. Even those girls with an end in mind seldom knew what actions to take to achieve that end. As Walker and Mehr (1992) put it, "They wanted to do something, but didn't know what. Sometimes they knew what, but didn't know *how*" (p. 42).

Holding "career fairs" with women and men from various less publicized careers (e.g., forensic chemistry and medical illustration) in attendance as role models would also open new horizons for some girls (and boys). Internship programs should be expanded to help students better assess what their interests and abilities are. Noble, Subotnik, and Arnold (1996) mention the need to increase the opportunities for bright young women to explore talent domains and learn of career possibilities. Lyons, Saltonstall, and Hanmer (1990) propose internships that rotate girls through several different jobs to provide a variety of career experiences. This seems

to be an excellent way for girls to test their present career ideas and to try out careers that they may not have known existed.

Particularly in the sciences, but in other subjects as well, large impersonal lecture classes in college and unavailable (or seemingly unapproachable) professors caused students to give up long-held interests. A recent study (Geraghty, 1997) of students in the sciences showed that the way the sciences are traditionally taught in college has a disproportionately negative effect on female and minority students, many of whom prefer to learn in the context of a more personal teacher-student relationship. What distinguished those who stayed with their planned science majors from those who switched was the development of coping strategies. Could these coping strategies be documented and then taught to young women as part of their preparation for college? Could these schools that treasure their small supportive communities warn girls that learning will be much more impersonal in the future, and that this is a problem in the structural organization of universities, not a personal problem? Could they encourage them to find supportive peer groups for learning (Komarovsky, 1985)?

Of course, if college professors of the sciences were to take seriously the flight of so many bright women from their fields, they might attempt to change their pedagogical methods. Certainly, this has been suggested several times (Tobias, 1990; Dembner, 1993; Geraghty, 1997), but the traditions of how science is taught, with its "weeder" introductory courses, are very strong and will change slowly, if at all. Structural changes in the universities would be necessary to allow professors more time for teaching and interacting personally with undergraduates.

In my book (Shmurak, 1998), I cite examples to show that often women's career paths are not as linear as men's, and it may be that several of these young women return to career paths they have abandoned or find new ones in the years ahead. Here is Kerry (Table 3) speaking this year about her future; she is an academic superstar who has "fallen back" on teaching as a safe career, and yet, is there is a glimmer of something more?

> I'm majoring in English literature because it is something that moves my heart and spririt and I really love it. But it's not the most practical thing in the world

and I'm not sure I want to become a professor and do research. I'm not sure I'm really cut out for the academic university world. So I'm also doing the undergraduate teacher education program which will give me a high school English teacher's certification when I graduate in May 2000. I think I'm more cut out for high school teaching anyway. My experiences with teaching have made me more sure it's what I want to do, with English as a second language in Providence, working with Latin American immigrants. And down here (in Costa Rica) I have been working on government literacy programs, teaching adults how to read and write. Right now I think I want to teach right after college. I also would love to continue to live in other countries and have been looking into options like teaching with the Peace Corps or World Teach.

Of course all of this has changed since high school. You have more experiences and realize more what you want to do and where your heart is drawn, And it changes your goals. I wouldn't really call it a goal for me anymore. Because I've been thinking about life less as goals and more as a journey for me. It makes me excited and happy that I don't know exactly where I will be in two years but I know I will be doing something I love and will be happy and I hope that in my life I can change my career when I want to do something different and never stay in the same thing for the sole reason that I don't feel like starting something new.

References:

Arnold, K.D. (1995). *Lives of promise: What becomes of high school valedictorians.* San Francisco: Jossey-Bass.

Betz, N.E. & Fitzgerald, L.F. (1987). *The career psychology of women.* Orlando, FL: Academic Press.

Csikszentmihalyi, M., Rathmunde, K., & Whalen, S. (1997). *Talented teenagers: The roots of success and failure.* Cambridge: Cambridge University Press.

Dembner, A. (1993, December 8). Women in math, science are studied. *The Boston Globe*, p. 16.

Eccles, J.S. (1989). Bringing young women to math and science. In M. Crawford & M. Gentry (Eds.), *Gender and thought: Psychological perspectives* (pp. 36–58). New York: Springer-Verlag.

Ethington, C.A., & Wolfle, L.M. (1988). Women's selection of quantitative undergraduate fields of study: Direct and indirect influences. *American Educational Research Journal, 25*(2), 157–175.

Farmer, H.S. (1985). A model of career and achievement motivation for women and men. *Journal of Counseling Psychology, 32*, 363–390.

Geraghty, M. (1997, January 10). Why bright students abandon plans to major in the sciences. *The Chronicle of Higher Education*, p. A50.

Graber, J. (1994, November). The influence of educational context on life and career aspirations: A longitudinal investigation. Paper presented at Studies in Success conference, Mount Holyoke College, South Hadley, MA.

Holland, D.C., & Eisenhart, M.A. (1990). *Educated in romance: Women, achievement and college culture.* Chicago: University of Chicago Press.

Jordaan, J.P., & Heyde, M.B. (1979). *Vocational maturity during the high school years.* New York: Teachers College Press.

Komarovsky, M. (1985). *Women in college: Shaping new feminine identities.* New York: Basic Books.

Lyons, N.P., Saltonstall, J.F., & Hanmer, T.J. (1990). Competencies and visions: Emma Willard girls talk about being leaders. In C. Gilligan, N.P. Lyons, & T.J. Hanmer (Eds.), *Making connections: The relational worlds of girls at Emma Willard School* (pp. 183–214). Cambridge: Harvard University Press.

Maple, S.A., & Stage, F.K. (1991). Influences on the choice of math/science major by gender and ethnicity. *American Educational Research Journal, 28*(1), 37–60.

Noble, K.D., Subotnik, R.F., & Arnold, K.D. (1996). A new model for adult female talent development: A synthesis of perspectives from *Remarkable Women*. In K. Arnold, K.D. Noble, & R.F. Subotnik (Eds.), *Remarkable women: Perspectives on female talent development* (pp. 427–439). Cresskill, NJ: Hampton Press.

O'Hara, S.K. (1995). Freshmen women in engineering: Comparison of their backgrounds, abilities, values and goals with science and humanities majors. *Journal of Women and Minorities in Science and Engineering*, 2, 33–47.

Shmurak, C. B. (1994a). Girls' high schools—How empowering have they been? *The High School Journal*, *78*(1), 1–12.

Shmurak, C.B. (1994b). What will she be when she grows up? Career paths of independent school alumnae. *Independent School, 55*(1), 36–42.

Shmurak, C.B. (1998). *Voices of hope: Adolescent girls at single sex and coeducational schools.* New York: Peter Lang.

Spence, J.T., & Helmreich, R.L. (1979). *Masculinity and femininity: Their psychological dimensions, correlates and antecedents*. Austin, TX: University of Texas Press.

Super, D.E. (1963). Vocational development in adolescence and early adulthood: Tasks & behaviors. In D.E. Super, R. Starishevsky, N. Matlin, & J.P. Jordaan (Eds.), *Career development: Self-concept theory* (pp. 79–95). New York: College Entrance Examination Board.

Tobias, S. (1990). *They're not dumb, they're different: Stalking the second tier.* Tucson, AZ: Research Corporation.

Walker, B.A., & Mehr, M. (1992). *The courage to achieve: Why America's brightest women struggle to fulfill their promise.* New York: Simon & Schuster.